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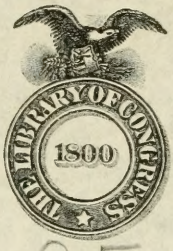

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51ST CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { EX. DOC. No. 110.

WOMEN'S SILK CULTURE ASSOCIATION.

LETTER

FROM

THE SECRETARY OF AGRICULTURE,

TRANSMITTING

Reports upon the operations of the Women's Silk Culture Association of the United States and of the Ladies' Silk Culture Society of California, and upon experiments made in the District of Columbia with silk-reeling machinery.

JANUARY 16, 1890.—Referred to the Committee on Agriculture and ordered to be printed.

DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D. C., January 14, 1890.

SIR: The act of Congress approved July 18, 1888, requires, among other duties, that the Secretary of Agriculture shall transmit to Congress reports of the expenditures and the results obtained by the Women's Silk Culture Association of the United States, and by the Ladies' Silk Culture Society of California, in their experiments for the encouragement and development of the culture of raw silk. It also requires the Secretary to transmit a report of experiments made in the District of Columbia with automatic silk-reeling machinery, and also of all sales of silk and silk waste, and purchases of cocoons, with the names and residences of all producers of cocoons of whom purchases are made. In accordance with these requirements, I have the honor to transmit herewith copies of said reports for the fiscal year ending June 30, 1889.

The act of Congress approved March 2, 1889, requires that Joseph Neumann shall report to Congress through the Secretary of Agriculture, on or about the 1st day of January, 1890, the results of his experiments with the wild native silk-worm of California. I have the honor to transmit herewith the report of the said Joseph Neumann.

Very respectfully, your obedient servant,

J. M. RUSK,
Secretary.

HON. THOS. B. REED,
Speaker House of Representatives.

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REPORT OF EXPERIMENTS MADE IN THE DISTRICT OF COLUMBIA.

UNITED STATES DEPARTMENT OF
AGRICULTURE, SILK SECTION,
Washington, D. C., January 6, 1890.

SIR: I have the honor to hand you herewith my report upon the experiments with automatic silk-reeling machinery which have been conducted in this Department, which should be forwarded to Congress in accordance with the provision of the act approved July 18, 1888, "making appropriation for the Department of Agriculture, and for other purposes."

The general object of the experiments which we have been making under the authority of that act has been to improve and make practicable for work in the United States the Serrell automatic silk-reel. This is the only automatic silk-reel which exists, and there was therefore no option on the part of the Department whether it or another should be adopted as a basis of experiments. At the beginning of the last fiscal year the experimental silk filature was at a standstill because the machine of which we had secured drawings from Europe had not succeeded as well as we had hoped, and experiments were then in train with a view to making it work. There are two main parts of the automatic silk-reel. The *control movement* measures the thread and, when the latter becomes too small, sets in operation an electric current by which the *feed movement* is put in motion and a cocoon added to the thread. The first object of my experiments was to produce a feed movement which should be absolutely automatic and do away with the great amount of labor which was entailed by filling by hand the magazine used in the original automatic reel. This object has been attained, and a feed movement which works successfully has been constructed and six of them are now ready to be put in operation. The control movement made during the previous fiscal year, while it works to a certain degree of satisfaction, was not all that could be desired, and a new one has therefore been designed which does much better. Two machines are now in operation with these new movements and they are doing satisfactory work. It is not improbable that there may yet be found some details which will need correcting, but as far as can be seen the main difficulties have been overcome.

It is important that it should be understood that the improvements which have been mentioned do not in any way involve any change of principle of invention. On the contrary, they are improvements of mechanical details, the principle of the original automatic machine having been adhered to, as it is felt that that principle is the only good one and the one upon which the automatic silk-reel of the future will be based. That a thoroughly automatic silk-reel is a possibility is a matter of which there can be no question. That it is a necessity for the United States is equally indisputable. It is important that the reels as now constructed should be given a thorough trial and that im-

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provements of details should be continued until a machine is constructed which will be not only as nearly perfect as possible in the performance of its functions, but also as simple in its mechanical details and as difficult of derangement as it can be made. Under existing instructions I shall deem it my duty to follow out a line of experiments tending towards this end.

I transmit herewith a list of the names and addresses of all persons from whom we have purchased cocoons during the fiscal year ending June 30, 1889, and the amount purchased from each, together with a statement of the sales of raw silk and waste which have been made in accordance with law.

Yours respectfully,

PHILIP WALKER,
Chief of the Silk Section.

HON. J. M. RUSK,
Secretary of Agriculture.

Report of purchases of cocoons and sales of silk during the fiscal year 1888–'89.

PURCHASES.

Total quantity of dry cocoons purchased 2,421 pounds, 9 ounces.	
Amount paid therefor	$2,138.03
Average price per pound	.88

SALES.

Raw silk to Belding Bros. & Co., New York, June 14, 1889, 133¼ pounds, at $3.60 per pound		$480.60
Waste to Cheney Bros., S. Manchester, Conn., March 27, 1889:		
Waste silk, 107¼ pounds, at 81 cents	$87.08	
Unreelable cocoons, 209¾ pounds, at 45 cents per pound	94.44	
Partly reeled cocoons, 129¼ pounds, at 36 cents per pound	46.53	
		228.05
Total sales		708.65

List of persons from whom cocoons were purchased during the fiscal year 1888–'89, togeth with their addresses, quantities purchased, and sums paid therefor.

Name.	Address.			Weight.	Valu
	Town.	County.	State.		
				Lbs. oz.	
Adelaide E. McKellips	Westville	La Porte	Ind	2 8	$1.
Laura Harrison	Eureka	Marion	Fla	3 8	3.
F. E. Miller	Moore	Spartanburgh	S. C	3 8	3.
Mrs. A. W. Smith	Petersburgh	Dinwiddie	Va	3 4	3.
L. Addie Gaston	Duncan's	Spartanburgh	S. C	9 12	10.
Frank Warren	Grand Bay	Mobile	Ala	6 0	6.
Mrs. M. T. Morton	Bellwood	Butler	Nebr	9 0	4.
A. E. Webb	Crockett	Houston	Tex	7 4	7.
B. Guyral	Rayne Station	Arcadia	La	5 12	6.
Louie E. Mathiew	Covington	St. Tammany	La	8 8	8.
George Mitchel	Leesburgh	Lake	Fla	5 8	4.
J. S. Ramsey	Oconee Mills	Hall	Ga	12 4	12.
Carrie Price	Kosse	Limestone	Tex	14 1	14.
A. E. Axtell	Fleming	Liberty	Ga	3 12	3.
James Pritchard	Quincy	Gadsden	Fla	4 4	3.
Ag. Legreve	Winter Park	Orange	Fla	1 4	1.
F. Grambarth	New Orleans	Orleans	La	1 0	
C. V. Ritter	Apopka	Orange	Fla	9 4	9.
Fannie Jenkins	Camden	Wilcox	Ala	4 0	3.
Lizzie Walters	Lakeside	Clay	Fla	2 8	2.
C. B. Berkenkamp	do	do	Fla	2 8	2.
Mrs. Z. P. Moses	Sumter	Sumter	S. C	2 0	1.
Eleanor Lever	Waldo	Alachua	Fla	1 8	1.
Otto J. E. Urban	Thorndale	Milan	Tex	1 0	1.
Hannah Seavey	Harrell's Store	Sampson	N. C	21 8	21.
M. V. McGaugh	Collirene	Lowndes	Ala	4 0	4.
Joseph Debaugh	Reading	Lyons	Kans	8 12	8.
Mathias Schneider	Pinckneyville	Perry	Ill	6 8	6.
Mary A. Fox	Coffeyville	Montgomery	Kans	8 0	8.
George A. Light	Sayers	Bexar	Tex	6	
M. A. White	Durango	Falls	Tex	7 4	6.
W. T. Dix	Fredericksburgh	Spottsylvania	Va	3 8	3.
Pearl Murdock	Oxford	Sumter	Fla	3 12	3.
T. W. Glenn	Mauldin Station	Greenville	S. C	1 12	1.
J. A. Crittenden	Greenfield	Dade	Mo	1 0	
L. Vial	Cave City	Barren	Ky	49 12	32.
M. K. Murdock	Sheppardtown	Le Flore	Miss	8	
Adam Clark	Washington	Washington	D. C	3 4	1.
R. M. Ruffner	Orlando	Prince William	Va	8 0	8.
Ellen A. Cook	Lake City	Columbia	Fla	6 12	7.
Alice Tucker	Dawson	Terrell	Ga	1 4	1.
Clara Slough	Daytona	Volusia	Fla	15 6	13.
W. M. Cummings	Jefferson	Marion	Tex	4 8	4.
R. M. Brassfield	Livingston	Sumter	Ala	3 0	3.
Martha Withers	Orange City	Volusia	Fla	2 0	1.
G. M. Clements	Monticello	Jasper	Ga	1 12	1.
Josephine S. Brown	Huntington	Putnam	Fla	1 0	
O. C. Burgess	Central Plains	Fluvanna	Va	12	
E. P. Keown	Graysville	Catoosa	Ga	1 0	
Mrs. Delisle A. Whitfield	Strabane	Lenoir	N. C	4 4	4.
Mrs. Delia Jennings	Patoka	Marion	Ill	4 8	4.
Mrs. M. J. Ingrem	Ellaville	Schley	Ga	2 0	1.
Mrs. Sarah J. Atherson	Science Hill	Pulaski	Ky	3 8	3.
Cora Douglas	Coffeyville	Montgomery	Kans	2 0	2.
Mrs. L. E. Harris	Detroit	Wayne	Mich	5 4	4.
Hilton Vaughn	Walkersville	Greeneville	S. C	1 4	1.
Hans Rasmus	Corning	Nemaha	Kans	1 4	1.
Miss Daisy Henderson	Croft	Mecklenburg	N. C	2 14	2.
Mrs. H. C. Hackley	Martin Station	Dallas	Ala	4 8	4.
G. G. Harman	Huntingdon	Huntingdon	Pa	5 4	5.
Mrs. Geo. Thurston	Lookout	Pettis	Mo	8 8	5.
Mrs. K. Harmon	Regret	McMinn	Tenn	2 0	2.
Mrs. C. M. Busey	Champaign	Champaign	Ill	2 0	1.
Mrs. Jane E. Hancock	Paris	Lamar	Tex	1 4	1.
Nettie Painter	Rockingham	Rockingham	Va	17 2	14.
Mrs. Sarah O. Fiscus	Mt. Orab	Brown	Ohio	1 4	
Jas. L. Webb	Anderson	Madison	Ind	11 0	11.
Dr. D. A. Friesen	Jansen	Jefferson	Nebr	12 0	13.
Wm. H. Collings	Raytown	Jackson	Mo	4 6	4.
Andrew J. Dolph	Rising Sun	Ohio	Ind	8 4	8.
S. Y. Morrow	Fayetteville	Washington	Ark	1 0	1.
Mrs. J. J. Bartlett	Tampa	Hillsborough	Fla	3 0	3.
Mrs. Clara Mason	Edge Hill	King George	Va	4 4	4.
Miss Lizzie Bell	Clover	York	S. C	2 8	2.
Miss Cora Douglas	Coffeyville	Montgomery	Kans	12	
Mrs. Mary T. Newkirk	Ivanhoe	Sampson	N. C	4 4	4.
Mrs. A. E. Rieke	Texas	Heard	Ga	3 8	3.
W. E. Hutchinson	Long Lane	Dallas	Mo	1 4	

List of persons from whom cocoons were purchased during 1888-'89, *etc.*—Continued.

Name.	Address.			Weight.	Value.
	Town.	County.	State.		
				Lbs. oz.	
Miss Nannie C. Reynolds	Bentivoglio	Albermarle	Va	1 14	$1.59
Mrs. Scott Brown	Anderson	Madison	Ind	2 0	2.00
Lizzie Smith	Forestville	Prince George	Md	2 3	1.75
Edgar E. Parrett	Newtonville	Fountain	Ind	3 8	3.50
Mrs. M. A. Rogers	Emporia	Lyon	Kans	4 4	1.70
Miss M. P. Bailey	Lexington	Holmes	Miss	12	.67
Mrs. P. M. Kenner	Sarpy	St. Charles	La	1 2	1.18
Do	do	do	La	1 12	1.83
H. T. Harlee	Mars Bluff	Marion	S. C	4 0	4.20
Mrs. A. J. Mercer	New Supply	Brunswick	N. C	11 0	11.00
L. S. Crozier	Little Rock	Pulaski	Ark	8 8	8.50
Miss Jennie Rosamond	Brushy Creek	Anderson	S. C	31 12	27.67
Mrs. F. M. Case	Melvern	Osage	Kans	5 12	6.03
Theo. Flentjen	San Antonio	Bexar	Tex	1 12	1.22
Mrs. Mary P. Jones	Johnsonville	Wayne	Ill	2 8	2.75
Leon Pallud	Loreanville	Iberia	La	12 0	9.71
Mrs. Mathilde Schaeffer	Boerne	Kendall	Tex	3 8	3.15
Miss M. I. Taylor	Clarksville	Red River	Tex	3 4	2.92
Mrs. Lubrina Eads	Decatur	Wise	Tex	4 1	4.67
Mrs. Elizabeth Lawry	Pott's Camp	Marshall	Miss	1 4	.75
Geo. H. Rice	Bandera	Bandera	Tex	4 8	4.50
Mrs. Mattie Eick	Deputy	Jefferson	Ind	2 0	2.10
David Jones	Wyoming	Stark	Ill	12 14	12.06
Miss Flora E. Ralph	Vinton	Gallia	Ohio	6 6	6.69
Peter Joseph Schmitz	New Market	Scott	Minn	2 14	2.12
Miss Laura Chapman	Grant Park	Kankakee	Ill	3 0	1.50
Mrs. J. E. Gladish	Higginsville	La Fayette	Mo	3 4	3.25
Miss Hessie C. Brown	Moscow	Clermont	Ohio	6 8	6.50
Nellie Fay	Franklin	Franklin	Nebr	3 0	2.40
Lottie Fay	do	do	Nebr	2 0	1.60
Mrs. A. I. Sherwood	Hebron	Porter	Ind	2 0	2.10
Mrs. C. M. Wilson	do	do	Ind	27 10	27.28
Miss Elizabeth C. Frazer	Silver Springs	Wilson	Tenn	6	26
Miss Mollie E. Miller	Outville	Licking	Ohio	10 4	8.20
Mrs. Minnie Cornelius	Gardnersville	Pendleton	Ky	1 8	1.35
Miss Edith M. Hewitt	Eureka Springs	Carroll	Ark	1 0	50
J. J. McCoy	Pleasant	Martin	Ky	2 4	2.25
F. W. Schumacher	De Witt	Saline	Nebr	3 6	3.37
Miss L. M. Inoin	Irwin	Goochland	Va	4 0	4.20
Martin Mayer	Conant	Perry	Ill	12 0	12.60
John A. Richenbacher	Gahanna	Franklin	Ohio	12	75
Miss S. E. Howe	Chambersburgh	do	Pa	5 0	4.37
Miss Bettie Hines	Defeated	Smith	Tenn	1 1	52
Francis Althouse	St. Marie	Jasper	Ill	3 0	3.00
Mrs. Scott Conger	Peach Grove	Rockingham	Va	1 4	1.12
Mrs. R. S. Fairbanks	Lindenville	Ashtabula	Ohio	10 8	11.02
M. Ferguson	Greenwood	Moore	N. C	5 0	5.25
Miss Mollie Phillips	Warrensburgh	Johnson	Mo	2 8	2.62
J. H. Samuelson	Ophiem	Henry	Ill	2 6	2.25
Miss Jennie Haff	Chalmers	White	Ind	2 0	2.10
Mrs. Mary M. Puryear	Franklin	Williamson	Tenn	9 0	8.90
Ben. Lamason	Mackinaw	Tazewell	Ill	1 8	1.50
Fred. Meyer	Appelo	Conway	Ark	2 12	1.78
Mrs. Ellen Weirich	Chambersburgh	Franklin	Pa	3 8	3.67
Mrs. Susan S. Sykes	Opelika	Lee	Ala	3 4	3.57
Mrs. Martha Ross	Chillicothe	Ross	Ohio	4 8	4.72
Mrs. Susan A. Robinson	Peach Bottom	Grayson	Va	2 12	2.75
M. A. Owens	Mauldin	Greenville	S. C	4 12	4.75
N. J. Knight	Du Quoin	Perry	Ill	7 0	7.55
Mrs. M. Gibney	Sumner	Lawrence	Ill	3 0	3.00
Mrs. M. E. Frankenfield	Arcola	Douglas	Ill	3 4	3.41
Mrs. Mary L. Baker	Painesville	Lake	Ohio	3 0	2.55
J. W. Acker	Bushy Creek	Anderson	S. C	9 0	9.45
Mrs. Ellen Trenner	Arcola	Douglas	Ill	4 8	4.72
Miss Rosy Morgan	Livonia	Washington	Ind	4 12	5.22
Mrs. Henry Martin	Henderson	Knox	Il	3 10	3.62
Rudolph Heiser	Keokuk	Lee	Iowa	3 0	3.15
Mrs. Kate C. Dutton	Toronto	Woodson	Kans	14 4	14.25
Mrs. I. P. Carpenter	Wyoming	Stark	Ill	2 10	2.36
Isabel W. Benet	Palatka	Putnam	Fla	1 2	.56
Owen E. Correll	El Dorado	Butler	Kans	2 8	2.62
Miss Cynthia Granger	Westfield	Morrow	Ohio	2 4	2.13
Mrs. Eva E. Thomas	Milroy	Rush	Ind	2 0	2.10
Ralph Sweet	Curryville	Pike	Mo	3 0	3.15
Miss Amanda Shelton	Arcola	Douglas	Ill	26 8	26.50
August Luckan	Fall Leaf	Leavenworth	Kans	0 8	.40
W. D. Cullins	Mineral Point	Tuscarawas	Ohio	2 4	2.25
Byron Carney	Sibley	Ford	Ill	2 8	1.62

List of persons from whom cocoons were purchased during 1888–'89, *etc.*—Continued.

Name.	Address.			Weight.	Value.
	Town.	County.	State.		
				Lbs. Oz.	
Hulda Whitington	Benton	Franklin	Ill	1 14	$2.0
Miss Maggie Brayshaw	Du Quoin	Perry	Ill	31 0	15.5
Miss Mary A. Fetrow	El Dorado	Butler	Kans	5 0	4.5
James Mariz	Northampton	Hampshire	Mass	10 8	9.4
Mrs. A. H. Fahnestock	Chambersburg	Franklin	Pa	12 12	10.2
Philip Marquardt	Norwalk	Fairfield	Conn	1 4	1.5
Dr. H. L. Judd	St. Louis	St. Louis	Mo	7 0	5.4
Mrs. Delta Simms	Keighley	Butler	Kans	1 8	1.2
Mrs. F. W. Curtis	Arcola	Douglas	Ill	33 0	29.7
Byrd Montgomery	Walnut Ridge	Lawrence	Ark	12	.7
Mrs. J. B. Dykes	Ivanhoe	Lake	Ill	1 0	.8
Mrs. R. Colgan	Hickman's Mills	Jackson	Mo	3 8	3.1
Mrs. Dr. Strother	Mound Valley	Labette	Kans	2 4	2.3
Miss Annie Rinard	Muskingum	Washington	Ohio	1 12	1.4
Miss Margaret Sydner	Champaign	Champaign	Ill	1 8	1.5
Mrs. W. W. Prigmore	Alma	La Fayette	Mo	2 4	2.2
Mrs. A. T. Stewart	Warrensburgh	Johnson	Mo	5 0	5.2
Philip Mick	North Vernon	Jennings	Ind	3 0	3.4
Isaac Banta	Rocklane	Johnson	Ind	2 0	2.0
S. S. Lilly	Brewersville	Jennings	Ind	1 4	1.2
Mrs. Pauline Beard	Kirksville	Monroe	Ind	2 0	2.1
Mrs. E. T. Cosler	North Indianapolis	Marion	Ind	3 8	3.5
Mary B. K. Plough	Chambersburg	Franklin	Pa	9 0	7.2
Charles Huddelson	Mulvane	Sedgwick	Kans	4 0	4.0
Mrs. Harriet E. Duncans	El Dorado	Butler	Kans	1 0	1.0
Miss Dakota Taylor	La Fontaine	Wilson	Kans	2 0	2.1
Miss Lizzie Moss	Carrollton	Carroll	Mo	4 0	4.2
Miss Mollie Ellis	Bruce	Barren	Ky	2 8	2.5
Mrs. Estabrooks	Palatka	Putnam	Fla	2 8	2.0
John Rickenbacher	Gahanna	Franklin	Ohio	22 0	22.0
Do	do	do	Ohio	6 8	6.5
Lizzie A. Hickox	Toronto	Woodson	Kans	6 8	3.2
C. F. Wallace	Brussels	Lincoln	Mo	8	.4
Miss Clara A. Cooper	Henderson	Knox	Ill	46 0	29.8
Andrew Jones	Vervay	Switzerland	Ind	4 4	2.7
Mrs. M. A. Witmer	Cheney	Sedgwick	Kans	2 4	2.3
Mrs. Anna Kirkland	Prescott	Nevada	Ark	1 8	1.3
Miss Minnie Partridge	Paris	Edgar	Ill	7 4	7.6
Emmet C. Higgins	Fayetteville	Johnson	Mo	3 0	3.0
Mrs. Sarah A. Drew	Brighton	Macoupin	Ill	5 4	5.7
Mrs. Julia E. Lide	Darlington	Darlington	S. C	2 4	2.2
Willard Thing	Du Quoin	Perry	Ill	27 8	19.0
Mrs. Martha Delaney	Carbondale	Jackson	Ill	6 4	3.8
W. H. Ray	West Plains	Howell	Mo	8	.2
Mrs. Rasa C. Liggett	El Dorado	Butler	Kans	5 4	5.2
F. Kunz	Bartow	Polk	Fla	1 4	1.2
Miss Mollie J. Detraz	Craig	Switzerland	Ind	12	.6
Andrew Broadbent	Erie	Neosho	Kans	6 0	6.3
Mrs. W. S. Watson and R. R. Neill.	Green Springs	Seneca	Ohio	3 4	3.4
Mrs. S. A. Conger	Cross Keys	Rockingham	Va	6 12	4.7
August F. W. Schmitz	St. Mark	Sedgwick	Kans	3 4	3.2
Malissa F. Ellis	Forest Hill	Sumner	W. Va	12	.8
May Thurber	Lincoln	Lancaster	Nebr	2 12	2.2
C. H. Brown	Grassy Cove	Cumberland	Tenn	1 0	1.0
Mrs. Pauline Penner	Springtown	Parker	Tex	1 8	1.7
Mrs. Clara D. Estabrook	Palatka	Putnam	Fla	4 12	3.8
Susan Pittsford	Granville	Licking	Ohio	12	.7
Susie Barrows	Rapinsville	Bates	Mo	7 8	7.0
Elizabeth McGuire	Carthage	Jasper	Mo	12	.3
Nettie E. Tarkington	Kirksville	Monroe	Ind	2 0	2.1
Mrs. Emma A. Leach	Dwight	Livingston	Ill	3 0	3.4
Abigail McCann	Moravia	Appanoose	Iowa	6 12	6.7
Miss Minnie Wortley	Farlington	Crawford	Kans	4 0	4.2
P. W. Corya	Moore's Hill	Dearborn	Ind	1 0	1.0
Ann Ferris	Sherburnville	Kankakee	Ill	1 12	1.3
Mrs. Barbara C. Fetrow	El Dorado	Butler	Kans	1 8	1.5
Gaston White	Goldsborough	Wayne	N. C	1 0	1.0
Ruthie Craig	Autun	Anderson	S. C	1 4	1.2
Alice Nighten	Woodburn	Macoupin	Ill	1 7	1.4
James Jenkinson	Lane	Franklin	Kans	8	.5
Mrs. L. O. Luther	Colona Station	Henry	Ill	2 0	1.7
Mrs. Jennie Duddleston	Paris	Edgar	Ill	1 0	1.0
Fred. Josse	Piqua	Miami	Ohio	89 12	56.1
Minnie Jaeger	Neosho	Newton	Mo	11 4	12.9
A. A. March	Lyons	Rice	Kans	1 8	.9
Abbie Brabson	Highland	Highland	Ohio	1 8	1.2
Stella A. Coy	Foristell	St. Charles	Mo	10	.6

List of persons from whom cocoons were purchased during 1888–'89, *etc.*—Continued.

Name.	Address.			Weight.	Value.
	Town.	County.	State.		
				Lbs. oz.	
Dr. R. B. Greenlee	Conway	Faulkner	Ark	2	$0.06
James C. Nagle	Baltimore	Fairfield	Ohio	7 8	5.25
Mabel Campbell	Grenola	Elk	Kans	7 8	5.62
Mrs. H. V. Miller	Jonesville	Hillsdale	Mich	3 0	3.00
R. E. Miller	Pierce City	Lawrence	Mo	2 8	1.87
Frank Graves	Nineveh	Johnson	Ind	1 0	.90
Martin Moss	Goodwin's Corner	Union	Ind	12 0	10.80
H. E. Preston	Grant Park	Kankakee	Ill	12 8	10.00
E. J. Trout	Feesburgh	Brown	Ohio	2 4	2.36
Charles F. Groneweg	Dayton	Montgomery	Ohio	6 0	5.40
O. F. Stockman	Lawrenceburgh	Dearborn	Ind	3 8	2.62
M. W. Dare	Newark	Knox	Mo	49 4	28.37
Fred Josse	Piqua	Miami	Ohio	5 0	4.00
Mrs. Mary E. Wood	Trilla	Coles	Ill	5 4	2.62
R. W. Armstrong	Canton	Lewis	Mo	1 0	.60
Hattie Truman	Elmore	Ottawa	Ohio	2 8	2.75
H. H. Jeter	Arcola	Douglas	Ill	29 4	19.12
Marietta L. Hearn	Hector	Jay	Ind	5 4	3.15
Sarah L. Jones	Piqua	Miami	Ohio	23 0	23.60
Isabell Gregory	Pleasanton	Linn	Kans	4 4	4.46
Mattie F. Ladd	Fredericktown	Knox	Ohio	2 8	2.75
Joseph W. Allen	La Crosse	Rush	Kans	2 12	2.75
M. M. Minter	Leatherwood	Henry	Va	6 8	3.90
E. Mackey	Pleasanton	Linn	Kans	34 8	35.12
Emily E. Lane	Sedowa	Sedgwick	Kans	1 0	.80
Anna V. Moore	Harrisonville	Cass	Mo	1 8	1.27
Mrs. George J. Ford	Carlton Station	Orleans	N. Y	22 8	19.12
D. L. Gibson	Plymouth	Marshall	Ind	23 12	20.18
A. C. Coates	Brown's	Dallas	Ala	4 0	4.00
Mary V. Asman	Evansville	Vanderburgh	Ind	8	.50
P. J. Lee	Coushatta	Red River	La	3 8	3.67
Miss D. M. Crawford	Goldville	Laurens	S. C	5 8	5.50
Halley Steele	Liberty Mills	Wabash	Ind	3 12	3.37
Henry J. Blue	Mount Sylvan	Smith	Tex	1 8	1.12
Do	do	do	Tex	3	.14
Emma J. Sturm	Dana	Vermillion	Ind	1 4	1.25
W. W. Sibcy	Loveland	Clermont	Ohio	7 0	7.00
Dora L. Haviland	Janesville	Rock	Wis	8	.52
John Pahlow	Lamar	Barton	Mo	1 0	1.00
A. Jane Ball	Cleveland	Bradley	Tenn	13 8	14.85
Mary E. Boggs	Equality	Anderson	S. C	14	.87
F. F. Weld	Sugar Grove	Warren	Pa	12	.63
Eva Alden	Alaska	Kent	Mich	9 12	10.23
Gabe Mc. Brown	Granby	Newton	Mo	1 4	1.25
J. M. McDaniel	Peoria	Hill	Tex	4 0	4.20
Mrs. S. J. Case	Sutton	Clay	Nebr	2 8	2.00
Rebecca M. Wilson	Three Mill Prairie	Washington	Mo	8	.55
Mrs. M. A. Maphet	Xenia	Bourbon	Kans	2 8	1.25
James Hibbart	E. Bountiful	Davis	Utah	2 4	2.25
Mabel Palmer	Burlingame	Osage	Kans	2 8	2.00
E. J. Hardtner	Pineville	Rapides	La	1 4	1.12
E. F. Cunningham	Glasco	Cloud	Kans	1 0	1.00
Anna Kohler	Chilo	Clermont	Ohio	22 8	22.50
Anna Fairbanks	Holland	Ottawa	Mich	2 4	2.25
Bridget Doyle	Schuyler	Colfax	Nebr	2 10	2.62
Michael Simon	Youngstown	Mahoning	Ohio	1 4	.62
Gustav Greding	Upper Alton	Madison	Ill	6 4	5.59
Sarah Acklin	Newton	Jasper	Ill	1 8	1.12
E. M. W. Spear	Cardington	Morrow	Ohio	1 0	.90
H. Blue	Mount Sylvan	Smith	Tex	2 0	1.50
J. D. Graham	Lane	DeWitt	Ill	12 0	12.00
Vartan M. Donigian	Cincinnati	Hamilton	Ohio	4 12	3.08
D. W. Rankin	Champaign	Champaign	Ill	1 4	1.31
Mrs. H. J. Watson	New Orleans	Orleans	La	1 12	1.92
M. J. Carl	Monmouth	Crawford	Kans	2 4	2.02
Mrs. Helen Council	Lexington	Henderson	Tenn	4 12	4.98
William Smith	Hazleton	Buchanan	Iowa	4 8	4.95
L. W. Strange	La Fontaine	Wilson	Kans	1 4	.93
Bessie R. Smith	Fredericksburgh	Spottsylvania	Va	13	.85
Irene Dunn	Grape Vine	Tarrant	Tex	3 4	3.37
R. E. Messersmith	Chambersburgh	Franklin	Pa	6 0	5.00
Catherine Vanderhoof	Newton	Jasper	Ill	2 0	1.50
C. J. Reed	St. Clere	Pottawatomie	Kans	3 0	3.00
Bula Wallace	Bloom	Cook	Ill	29 0	20.30
Norman A. Jay	Steeleville	Randolph	Ill	9 0	9.00
Martha Bradley	Walton	Cass	Ind	2 0	2.00
Justus Babb	Nashville	Washington	Ill	11 0	11.00
F. J. Adams	Montserrat	Johnson	Mo	6 4	6.37

List of persons from whom cocoons were purchased during 1888-'89, *etc.*—Continued.

Name.	Address.			Weight.	Value.
	Town.	County.	State.		
				Lbs. oz.	
R. Frank	Hudson	Lenawee	Mich	2 12	$2.7
A. Jaquins	Hazel Green	Madison	Ala	3 8	3.6
J. Gottlieb Schatz	Amboy	Blue Earth	Minn	35 0	26.2
Charley A. McKellips	Westville	La Porte	Ind	3 0	1.5
Jane Watt	Troy	Madison	Ill	1 14	1.8
E. L. Nelson	Sharon	Barber	Kans	2 4	1.9
K. T. Burnam	Marble Falls	Burnet	Tex	1 8	1.5
E. Nichols	Neosho Falls	Woodson	Kans	6	.1
Hannah Baird	Pataskala	Licking	Ohio	3 14	3.0
Sarah Lackey	New Bellsville	Brown	Ind	23 8	25.8
H. J. Blue	Mount Sylvan	Smith	Tex	1 12	1.3
Benjamin Powell	Clifton	Washington	Kans	3 0	3.0
Luther M. Watkins	Cedar Grove	Montgomery	Md	4 0	4.0
Sarah Campbell	Iantha	Barton	Mo	4 13	1.9
Sarah Johnson	Penfield	Champaign	Ill	13 0	12.5
J. R. Martin	Farlow	Moultrie	Ill	3 6	3.8
Alex L. Gilespie	Duck	Union	Ga	1 8	1.7
R. Cotterman	West Florence	Preble	Ohio	7 8	6.7
Dora D. Longman	Corwin	do	Ohio	24 0	25.2
C. Curdup	Louisburgh	Franklin	N. C	4 10	3.9
W. J. Nelthorpe	Burlington	Calhoun	Mich	12 2	8.4
Fannie Forbes	Concordia	Cloud	Kans	25 8	29.3
A. Streby	Canal Fulton	Stark	Ohio	6 0	6.3
Baird Snyder	Carbondale	Jackson	Ill	8 2	8.1
M. I. Shively	Frankfort	Ross	Ohio	2 0	1.5
Fred. A. Reynolds	Buda	Bureau	Ill	11 10	12.2
John A. Hogg	Shelton	Buffalo	Nebr	2 12	3.1
Jennie Kinney	Mentor	C mpbell	Ky	2 0	2.3
Johannes M. Hansen	Grand Island	Hall	Nebr	11 8	10.3
Mrs. C. M. King	Mokena	Will	Ill	12	.7
John Shoemaker	Putneyville	Armstrong	Pa	2 12	3.1
Mary Truax	Greentown	Howard	Ind	2 4	2.5
Jacoble	South West	Elkhart	Ind	3 0	3.1
J. W. Ducker	Mokena	Will	Ill	3 0	3.0
John Kranse	Jansen	Jefferson	Nebr	3 8	3.8
Ph. Schnoeder	Yoxall	Osborne	Kans	3 8	6.7
Mary Stevens	Rio Grand	Gallia	Ohio	3 8	4.0
Miss Emma Hughes	Wabash	Giles	Va	12	.5
J. T. Du Souchet	Warsaw	Hancock	Ill	4 0	3.4
Nellie Sevier	Veltier	Sullivan	Tenn	1 4	1.0
Jennie Kinney	Mentor	Campbell	Ky	1 4	.7
Sallie G. Wyatt	Poplar Mount	Greenville	Va	1 0	1.0
Alfred Osborn	Norfolk	Madison	Nebr	14	.7
Clara E. Brown	Albany	Green	Wis	2 0	1.7
Sarah Lymenstall	La Barge	Kent	Mich	1	.0
Dora M. Smith	Menallen	Adams	Penn	5 0	4.2
N. S. Duncan	Baltimore	Baltimore	Md	1 14	.9
Laura Dare	Newark	Knox	Mo	57 12	34.3
W. K. Nelson	Augusta	Richmond	Ga	6 8	6.5
Christeann Stouder	Newtonville	Clermont	Ohio	1 12	1.8
Mary E. Kitchen	Shanghai	Berkeley	W. Va	1 0	1.0
M. E. Kane	Baltimore	Baltimore	Md	2 0	2.0
John P. Thiessen	Jansen	Jefferson	Nebr	8 6	5.1
Peter Fast	do	do	Nebr	9 0	5.4
Anna Walton	Rowena	Audrain	Mo	1 0	.8
Rosa C. Liggett	El Dorado	Butler	Kans	3 12	1.8
Clara Rynearson	Union City	Rudolph	Ind	4 2	3.0
Miss M. E. Kennon	Morristown	Belmont	Ohio	3	.1
M. L. Van Voris	Americus	Lyon	Kans	1 8	.7
Robert Thomson	Burlingame	Osage	Kans	12 0	6.0
L. G. Wilson	Parsons	Aurora	Dak	7 0	7.0
Mrs. C. F. W. Haskins	Petersburgh	Dinwiddie	Va	4 0	4.6
E. C. Forward	Spring Arbor	Jackson	Mich	2 0	2.0
Gertrude Riggles	Washington	Washington	D. C	12 0	5.5
J. B. Dickey	Newton	Harvey	Kans	31 0	27.9
Nina Crain	Washington	Washington	D. C	4	.1
Martin Mayer	Conant	Perry	Ill	6 5	6.5
M. E. Karstetter	Tipton	Moniteau	Mo	5 0	6.1
Miss Laura Biddle	Rossville	Vermillion	Ill	8 8	8.3
B. Decocque	Purdy	Barry	Mo	20 12	24.9
John Lewis	Miami	Saline	Mo	8 14	9.8
Charles Combs	Rossville	Vermillion	Ill	8 8	7.5
Martin Mayer	Conant	Perry	Ill	13 7	14.6
Jacob Schumeir	do	do	Ill	1 4	1.3
Anna Thiessen	Jansen	Jefferson	Nebr	56 12	56.5
P. W. Thiessen	do	do	Nebr	6 4	3.1
M. E. Palmer	Aiken	Aiken	S. C	16 0	8.0

List of persons from whom cocoons were purchased during 1888–'89, *etc.*—Continued.

Name.	Address.			Weight.	Value.
	Town.	County.	State.		
				Lbs. oz.	
Minnie Jaeger	Neosho	Newton	Mo	20 13	$23.52
C. W. Sykes	St. Louis	St. Louis	Mo	2 6	2.56
J. A. Marshall	Markham Station	Fauquier	Va	10	.80
Judia Davis	Woodburn	Macoupin	Ill	1 14	1.91
H. C. Hutchins	Manor	Baltimore	Md	3 12	4.50
Thomas J. Brazelle	Purdy	Barry	Mo	3 7	4.17
Madge O. Weirich	Reliance	Warren	Va	4 5	5.20
Isabel Hallam	Prairie City	Bates	Mo	12 14	14.53
Anna Garwood	Boonville	Warrick	Ind	8 12	8.75

Purchases of cocoons by States, fiscal year 1888–'89.

State.	Weight.	Value.	State.	Weight.	Value.
	Lb. oz.			*Lb. oz.*	
Connecticut	1 4	$1.57	Louisiana	36 10	$34.76
Mississippi	2 8	1.82	Pennsylvania	50 0	43.70
West Virginia	1 12	1.86	Kentucky	62 12	45.15
Wisconsin	2 8	2.22	North Carolina	54 8	54.22
Utah	2 4	2.25	Virginia	71 8	65.42
Dakota	7 0	7.00	Florida	71 12	65.66
District of Columbia	15 8	7.57	Texas	68 7	66.56
Massachusetts	10 8	9.45	South Carolina	96 2	85.57
Maryland	13 13	13.18	Nebraska	136 4	120.21
Arkansas	15 10	14.19	Indiana	185 0	176.38
Iowa	14 4	14.85	Kansas	249 14	225.66
New York	22 8	19.12	Missouri	270 11	229.26
Minnesota	37 14	28.37	Ohio	307 3	265.87
Alabama	32 4	31.64	Illinois	477 11	404.74
Michigan	37 3	32.97			
Georgia	33 8	33.30	Total	2,421 9	2,138.03
Tennessee	32 15	33.51			

REPORT OF THE WOMEN'S SILK CULTURE ASSOCIATION TO THE AGRICULTURAL DEPARTMENT, AT WASHINGTON, D. C., FOR THE FISCAL YEAR ENDING JUNE 30, 1889.

As continued almoners of the public money, which to the amount of $5,000 we receive annually from the Government of the United States, this association begs to report a careful and economic distribution of the same in the various channels of the silk industry, notably in the distribution of mulberry trees, the advisability of which plan was forced upon us by the fact that, in the first years of our work, hundreds of families rushed into the new industry, with such opportunities as a few odd mulberry trees here and there on the farm or the forest offered, to suddenly find that they could not increase their experiments owing to the lack of natural food for the silk-worm, and thus dropped out of the persistent and continued effort needed to successfully establish a new industry. This condition, forced on our notice by many facts, impressed us with the necessity of liberal and immediate planting of trees, and the following circulars were issued:

[Office of Women's Silk Culture Association of United States, 1224 and 1226 Arch street, Philadelphia.]

In accordance with the plans of the Women's Silk Culture Association, as suggested to the Congress of the United States, by whose dignified bodies the bill to appropriate $5,000 to the association to promote the industry of silk culture in the United States has passed into a law, the association desire to offer to the State agricultural schools, institutions, and reformatories, or to individuals who may have a purpose or desire to establish the culture of silk, a gratuity in mulberry trees, in lots not less than twenty-five nor more than one hundred. In every instance a guaranty must be given, signed by two vouchers, that the recipient who may accept these trees shall give them the proper attention required for their full fruition. It is desirable, in these days when the question of forestry has become such a momentous one, that we shall not only preserve the trees but increase them; and to this end the new movement of the association will be taking a step in the right direction.

The mulberry trees of many varieties, notably the *Morus alba* and *Morus japonica*, are clean, healthy trees, of large leaf, rapid growth, great age, and, most important, the product of leaves is of great commercial value. Further, from a small number of trees any quantity of cuttings can be taken during growth for a new nursery. It is hoped these claims to the planting of mulberry trees, which are without parallel, will encourage the planting of them without delay. A grove of such trees means wealth for the future.

The association, therefore, ask for orders for mulberry trees, the order stating the number, locality of planting, and the date at which they are required, as only two seasons are open for planting, autumn and spring. Prompt suggestions and orders are invited.

Mrs. J. Lucas,
President.
Mrs. V. C. Haven,
Corresponding Secretary.

To applicants for trees to feed silk-worms:

In both of the appropriations made to the "Women's Silk Culture Association of the United States," 1886-'87, by Congress a stipulated sum was directed to be spent in sending, to those who desired to plant, the proper trees for the food of the silk-worm free of charge. This we did last autumn and the present spring, and will continue to do the coming fall. The same clause is in the appropriation made to the California "Women's Silk Association" at San Francisco. We ask that orders for trees be sent not later than August for autumn planting and in the winter months for spring planting. This enables us to arrange orders so as to give time to the nurseryman to select his trees and ship at the proper time of planting. The first thing to be done towards the production of silk is a provision of food for the thrifty insect, which will take good care to perform its part if we are careful to perform ours, and its only proper and legitimate food is the leaf of the mulberry tree. This tree has been endowed with many properties, happily combining utility and pleasure independent of its primary purpose of production of an agreeable article of clothing; it leaves the surface much less impoverished than many other trees, its roots striking into the earth not obliquely but run deeply and perpendicularly. The ground between the rows of trees when planted in orchard form may be occupied with other products; neither the shade of the tree nor the dropping of rain from its leaves injures the plants growing beneath. It is also a matter of universal observation that no insect except the silk-worm feeds upon it. The experiment was tried by Monsieur Tullein, and it was satisfactorily proved that the product of this tree is the exclusive property of the silk-worm, the insect that apparently works only for man. The *Morus alba*, or "white mulberry," of which there are many varieties, has been generally adopted in America. The variety called *Multicaulus* is, in France and Italy, considered the best, but it has been found in this country too tender, even in the Southern States, to be always safe from our possible late frosts. It is natural to China.

The *Morus alba* has sound wood, beautiful leaves, and sweet fruit, and is mostly useful when its importance in silk culture is taken into consideration. The silk which it produces is of the finest quality. The fruit is white, roundish, oblong, and insipid. It is a tree of rapid growth. The bark, it is said, can be converted into a linen of the fineness of silk. One of its advantages is that its leaves come out earlier than any other, the silk-worms can be hatched earlier, and are thus saved from very hot weather.

Nurseries or plantations should have a sunny exposure, protected against strong winds. Any land suitable for raising corn is suitable to the mulberry. As fast as the fruit ripens it should be gathered. When a portion of the fruit is ripe, spread cloths under the trees and shake them gently every morning during the ripening season. One ounce of seed will give about 5,000 young trees.

Trees left to themselves are liable to assume forms as unsuitable to the taste of the horticulturist as inconvenient to those who gather the leaves. June is the best season for preserving, when the young twigs that are taken off may be given to the worms. Trees can be raised by suckers, separated from the tree early in the spring with some roots attached to them, treated as cuttings. In fact, the ways of increasing the quantity of food for the worm from a few good trees are various and too numerous to mention in small limits, but to any skillful farmer or tree raiser will suggest themselves.

When Providence does anything for man, it is his duty to co-operate.

The food plant of the silk-worm is the mulberry, of which two species are the best for this country—the white mulberry (*Morus alba*) and the Japan (*Morus japonica.*) The *Morus multicaulis* is not always hardy in this climate.

The mulberry grows readily and is easily propagated by cuttings, the easiest and surest method of planting to secure a stock. The cuttings should be planted in rows 4 to 6 inches apart, in light, rich soil, prepared by deep plowing and well pulverized. They should be about 6 inches long, and each to have not less than two eyes; three are more certain of growth. They should be almost entirely buried, leaving one bud above ground; the rows should be about three feet apart, which will give sufficient room to pass between them.

The quickest way to get a supply of leaves is to grow dwarfs. Set out the young trees from the nursery in rows 12 to 15 feet apart, and let the rows be 6 to 8 feet apart. Cut the tree down to about 15 to 18 inches from the ground. The height of the tree is easily regulated. The process of pruning not only promotes a strong and vigorous growth, but keeps the foliage within reach of easy picking for feeding purposes

The best time for planting cuttings or trees is in either March or April. The cuttings should not be transplanted before the second year.

The planting of mulberry trees in the hedge form will be found very advantageous; the same quantity of land will thus produce more leaves than from the standard trees, and the labor of gathering full one-half less. In the country and villages, where every family has plenty of ground by their dwellings, trees may be planted by the fences, so as to let the children pick the leaves to feed the worms. This is

what may be termed cottage culture, and every family of four or five children, in six weeks, can earn more than all the clothes they wear would cost.

As the best and first thing to be done by a silk-grower is to cultivate the kinds of mulberry trees or plants which will give the largest yield of silk, we know that the *Morus alba*, or white mulberry, and the *Morus japonica*, or Japanese mulberry, are certain to produce the best silk, and experiment will only increase expenses and render the value of your crop uncertain.

The *Morus japonica* has the largest leaves, and is so easily picked that the French breeders prefer it to any other as a cheap silk producer. Its standing well the winters of the North is proved by five years' growth in Kansas. It grows easily by cuttings, and many stems grow 6 feet high the first year.

We are all aware that climate is a matter of first importance in the growth of the mulberry tree. The great metropolis of China, Peking, 39° 54′ latitude, about three miles south of Philadelphia, may be quoted as her northern extremity of the silk-growing country, which extends as far south as the twentieth parallel of north latitude. It is in her central province, between the twenty-fifth and thirty-fifth degrees of latitude, that the greater part of her silk is produced. The eastern shore of North America is, in this respect, so similarly situated to the same shore of the Asiatic continent that the mean annual temperature of any given degree of latitude on our Atlantic shores will be found very nearly to correspond with the same degree of latitude in China, near the Pacific. China, also, in point of extent of surface and territory very much resembling those of the United States, it is evident that we of all nations under the sun have the best chance to equal that eminent nation as to the "golden fleece." Nature has done all she can for us; will a sound policy effect the rest? This question was asked in regard to the special industry of silk raising in 1623, and is not yet answered. In 1783 the legislature of Connecticut granted a bounty on mulberry trees and raw silk. In 1810 the sewing and raw silk of New London, Windham, and Tolland were valued by the United States marshal at $28,503, exclusive of the amount of "domestic fabrics." In 1837 it was announced that the "mulberry will grow and the silk-worm thrive throughout the whole length and breadth of the United States."

A few acres of land of ordinary fertility and a few dollars in money for the purchase of seeds and plants will enable a silk-grower to buy the foundation of a plantation on a considerable scale, and the first thing to be done towards the production of silk is a provision of food for the worm, that will take due care to perform its part if only we are careful to perform ours.

The quality of the silk does not entirely depend upon the food; general care throughout the entire progress, from the egg to the cocoon, is very essential to secure good cocoons. The general experience teaches that the best condition of the leaves for feeding is when they are free from dew or rain. The stripping of the leaves should not be begun until the dew has been absorbed by the heat of the sun, and ought to be finished before sunset. Wet leaves produce diarrhea, and it is important to have a supply of dry leaves. To avoid accident, and to secure a supply for rainy days, a stock should be kept on hand; they will keep for a couple of days in a cool, dry cellar; a brick or stone floor is best, or on a clean linen sheet in a cool, dark room. Do not let them be too much heaped together, and do not allow a change of temperature in the "leaf store," tending to promote fermentation if gathered in hot weather or left too long in a state of compression in bags and baskets. Dusty leaves must be wiped with a soft linen cloth. Accurate thermometers are very needful in silk culture, and every room in which the work is carried on should have several.

It should be impressed upon children, and all who are employed to pick leaves, to pass the hands up from the lower part to the top to strip off the leaves upward, not downward, as the latter may injure the buds. The picking of leaves requires great caution to prevent injury to the trees; nature never intended that they should be violently stripped of their foliage. All climbing of young trees should be avoided. Pruning-shears are very needful for tall trees. A pair can be attached by one of the handles to a pole any height most convenient, say ten feet, which, whilst it is held in one hand, is worked by means of a cord passing through a pulley, and attached to the other handle by the other hand. In the cities we see the tree trimmers using them in the streets every spring. My own preference would be for dwarf trees or hedges, if I were undertaking silk culture as a business, because the silk-worms, when preparing to spin, eat an immense quantity of food, and the easier the gathering of leaves is made, the better for all concerned in the feeding process.

As a rule, keep back the first hatching until the first leaves are developed sufficiently for food, but it is not always possible to do this in the variable climate of our Northern springs. Last spring the association received from Georgia specimens of cocoons, before the first leaf had appeared in the park, which shows that south of forty degrees should be the headquarters of silk culture, where the climate renders the work easier and certain of success.

To be provided with a resource against a backward spring, those who have space will find that a small hedge—the width of a garden border will answer—planted in a

southern exposure, sheltered by a building. Early in the spring, cover the hedge with straw or matting to protect it from the frost at night. A small space is sufficient, as in their "first age" the worms require very little food. I have heard that by careful gathering of the leaves in the early autumn, before they begin to fall, they can be dried and preserved, so that by carefully soaking them in pure cold water, and drying with a linen cloth, they can be fed to the early hatch quite acceptably.

Under the heading "Mulberry Leaves and Statistics," in the last edition (1839) of the best book on the "Mulberry Tree and Silk-worm," by Mr. J. Clarke, I find that in silk culture abroad there is a "division of labor." The "renting of trees and selling of leaves" is a business for a farmer or owner of land; it is one branch of the work, that of "producing silk" is another, and the connecting link is a "leaf market."

A leaf market in a city renders it quite possible for otherwise unemployed women and children whose houses have more rooms than are occupied to raise silk. If the children only are employed, it would be a great benefit; but there are women, old and young, incapable of heavy work, in all our populous cities, whose success in silk-raising would not only support themselves, but enrich the nation.

If productive labor is a source of wealth, both to nations and individuals, it is desirable that it should be increased to its greatest possible extent. This can only be done by seeking out objects to which the labor of the young, old, and infirm is adapted, and among these is none more appropriate than the culture of silk. The same remarks are substantially true with respect to its manufacture.

Leaf markets are established facts, not only on the continent of Europe, but in Asia. I quote from an eye-witness: "On all the roads and avenues to Broosa we saw mules, camels, asses, with all manner of conveyance, freighted with mulberry leaves for the leaf market. In the city itself we saw many families, on the approach of the silk-raising season, on the move to clear and make ready, for the labors of the silk-worm, every spare apartment in the house. Two-thirds of every house is a cocoonery." In the town there is the leaf market every day, and in the houses are the worms feeding—a combination of town and country through the leaf market.

Suppose this example be followed in America, and enable all to profit who will.

Let the farmers enrich their hedges and fields with the wealth-giving tree, send its leaves by wagon, boat, or railroad, and enable every citizen, who is tied by his business to the city, to utilize every idle hand in his family and empty room of his house, by providing the silk-worms and the food for them, and mark out a way to industry, morality, and health by raising silk.

At the close of the thirteenth century, the celebrated traveler Marco Polo, in his narrative of travels in the Celestial Empire, says: "No fewer than one thousand carriages and pack horses, loaded with raw silk, make their daily entry into Cambula, where silk of various textures are manufactured to an immense extent.

Two essentials to success, at the present time, are quantity and quality of cocoons Quantity of cocoons will open filatures in many directions, and make the supply of raw silk equal to the demand of the manufacturers; and quality will secure the sale of all the raw silk produced at fair prices.

A cocoonery for 1 ounce of eggs, 40,000, will cost about $57—and 1 ounce is amply sufficient to begin with. Any room that can be well ventilated and kept at a regular and moderate temperature will make a cocoonery.

Twenty frames or hurdles, with twine, tacks, and time, will cost about	$13.00
Racks for the frames	5.00
Ounce eggs (40,000)	5.00
One boy for four weeks	10.00
Man for two weeks	20.00
	$53.00

For the first week any woman or child in the house can easily pick the leaves and feed the worms.

With patience and perseverance the mulberry leaf becomes silk.

MRS. V. CAREY HAVEN, *Corresponding Secretary.*

These circulars were issued in the summer of 1887, and in the space of two years we have distributed in nearly every one of the States of the Union large numbers of trees, aggregating 27,624 trees, and have many orders for trees standing for the autumn of 1889.

This association feels it to be a matter of deep regret that this effort was not put forth in the first years of their work; but until the Government aid came to their assistance, this was not practicable, owing to a lack of funds and the necessity for seeking, from private sources, support for the association. Already we observe the increased interest thus awakened.

The class of people calculated for this industry, and among whom only it can take deep root, the agriculturists looking for new sources of income, live largely remote from the opportunities of knowing where and how to increase their possibilities of the new industry, and hail our offer of trees with great satisfaction.

We have experienced some difficulty in procuring good trees, in a proper state of cultivation for transplanting, but all these difficulties will yield to demand, and thus a new and healthy stimulus be given to this branch of silk culture.

We are gratified with the quality and quantity of cocooons coming into the Philadelphia filature at this early date of 1889, as a slow and gradual improvement.

Many other stations for the purchase of cocoons have been opened, notably at the sericulture department at Washington, Kansas, and California, and we have much correspondence with these stations in reference to reeling their product, evidently with a view of having it done at less cost than they seem able to do it.

In many places there are calls for the establishment of new auxiliary associations, and one has been formed at Boston to represent the State of Massachusetts. It would be well for the more rapid advancement of the industry if every State had its Women's Silk Culture Association. We are pleased to call your attention to the successful reeling of silk, on simple American reels, at the Philadelphia filature. We have this year carried out a successful education of silk-raising under the care of our American reelers, with a view of teaching them all the branches, that they may in turn teach others. Our best reelers, with fairly good cocoons, can turn out one pound of raw silk daily, and with six girls and six reels we run 24 skeins of raw silk at one time.

California, Kansas, Illinois, Delaware, Massachusetts, and many other States are in special correspondence with us in reference to reeling and the establishment of auxiliary associations, thus showing continued interest in the development of silk culture throughout the States.

In the South of Ireland, too, an association of ladies interested in silk culture has been formed, largely through the influence of this association, under the patronage of the Earl of Bandon. Dora de Blaquiere, one of their associates, states in her circular "that through the kindness of the Women's Silk Culture Association of the United States, at Philadelphia, I have been supplied with information up to date of all their proceedings, anxieties, and successes from 1880 to 1888." This association bids fair, under liberal patronage, to succeed in its effort.

The Serrell reels, which are in place at the silk department at Washington, are marvels of automatic machinery, and may, in their fully perfected condition, work a revolution in the filatures of the world, especially as the industry increases in our own country, where, through the genius of the people and the freedom of our institutions, every industry reaches the highest stage of progress and perfection, and this Association, as the pioneers in the newly awakened interest in silk culture, regard with pleasure and satisfaction the liberal methods of the Government in thus developing all the best and newest appliances, to place silk culture prominently before this nation as one of its future industries.

A country with a rapidly increasing population and advanced status in arts and manufactures; a people second to none in refined and elegant tastes and with its coffers, both public and private, full to over-

flowing, can not afford to eliminate from its varied avenues of wealth and production the marvelous beauty and elegance of the products of the silk industry; and no higher channel can be found for the judicious expenditure of a portion of the nation's wealth than the fostering care of such industries as give scope and opportunity to the skill and labor of its people, thereby animating the man to the production of new matter for the use of others, and illustrating the life of the silk-worm in the axiom of the silk industry, in which is embodied the highest principles of life:

Not for ourselves work we.

Respectfully submitted. Mrs. JOHN LUCAS.

JULY, 1889.

Treasurer's report of the Women's Silk Culture Association, of the United States, to the Agricultural Department at Washington, D. C., for the fiscal year ending June 30, 1889.

[Under authority of the act "Making an appropriation for the Department of Agriculture and other purposes." October 6, 1888, received from United States Treasurer, Draft No. 16610, Treasury Warrant, No. 652, October 4, 1888, $5,000.]

HON. JEREMIAH RUSK, *Secretary of Agriculture:*

DEAR SIR: In accordance with request for detailed information concerning the "expenditures and results obtained under this appropriation," we beg to make the following statement for this fiscal year:

The filature was in operation during the fiscal year 459 days; 4 reels in operation two months; 2 reels in operation seven months. There were about 536 pounds of cocoons used, yielding 104 pounds 1 ounce of silk.

Received for sale of pierced and waste cocoons	$334.18
Received for sale of dress and flag silk	791.99

Cost of labor employed in reeling, sorting, etc.:

Salary of superintendent	$480.00
For reelers and sorters	390.81
Engineer	55.00

Reelers and sorters, average pay 90 cents per day.

To this summary we beg leave to add the following allied and necessary expenses:

Purchase of cocoons	$1,536.96
Rent, including steam-power employed	750.00
Repairs and incidentals to silk and reel room	64.71
Purchase of trees and freight	1,550.32
Printing postals, circulars, advertising for cocoons	232.90
Postage	59.50
Experimental school at Fairmount Park	133.97
State exhibits, auxiliaries, etc.	124.25
Silk-worm eggs, Milan	13.80
Committee to Washington, D. C.	27.55
Weaving dress and flag silk	1,351.08

We have paid $1,536.96 for the purchase of 2,040 pounds and 1½ ounces of reelable, pierced, and waste cocoons from over 123 persons of the following States: Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina Virginia, Utah.

We have distributed 17,801 mulberry trees to 28 States, as follows:

Alabama	25	Missouri	2100
Arizona	200	Montana	50
Delaware	350	Nebraska	11,200
Florida	1,115	New Jersey	500
Georgia	50	New York	125
Illinois	100	Ohio	175
Indiana	100	Oregon	100
Iowa	25	Pennsylvania	88
Kansas	5	South Carolina	5
Maine	25	Tennessee	50
Maryland	775	Texas	100
Massachusetts	85	Virginia	113
Michigan	125	Washington	75
Minnesota	50	Wisconsin	50

Instructions are given to any one choosing to take advantage of the opportunity. During the year we have had many visitors to the rooms, making inquiries in regard to silk culture and reeling.

We freely distribute circulars in regard to tree culture, and give full information on producing good cocoons.

The experimental school at the Park was entirely in the charge of young American women, their first effort in silk culture, and was very satisfactory. There were many visitors to the school, who expressed much interest in the industry, several persons taking object-lessons.

Managers of some reformatory schools are taking an interest in the work, hoping to make it an industry for the children. Trees have been planted, and next year those in charge expect to experiment in silk culture.

RECAPITULATION.

RECEIPTS.

Government Treasury	$5,000.00
Accrued interest on same	65.99
	5,065.99
Sale of Silk, etc.	791.99
Sale of waste cocoons, etc.	334.18
Total	6,192.16

EXPENSES.

Purchase of reliable, pierced and waste cocoons	1,536.96
Wages of reelers and sorters	390.81
Salary of superintendent	480.00
Salary of engineer	55.00
Rent, with steam-power employed	750.00
Repairs, incidental to reels, reel-room, etc	64.71
Purchase of trees and freight	1,550.32
Printing postals, circulars, advertising for cocoons	232.90
Postage	59.50
Experimental school at Fairmount Park	133.97
State exhibits and auxiliaries	124.25
Silk-worm eggs, Milan	13.80
Committee to Washington, D. C.	27.55
Weaving dress and flag silk	1,351.08
Total	6,770.85

Respectfully submitted.

MRS. H. P. TAYLOR, *Treasurer.*

FOURTH ANNUAL REPORT OF THE LADIES' SILK CULTURE SOCIETY OF CALIFORNIA.

The DEPARTMENT OF AGRICULTURE AT WASHINGTON, D. C.:

In accordance with the requirements of law, I have the honor herewith to submit the annual report of the Ladies' Silk Culture Society of California for the fiscal year ending June 30, 1890. Owing to the fact that the appropriation for the year did not become available until February, 1889, the operations of the society at its silk culture station were suspended during the months of August, September, and October. On the 1st of November, as there was a pressing necessity that work should be resumed, arrangements were made by which the receipt of the appropriation was anticipated with that end in view. This work consisted chiefly in sinking a well from which water might be obtained for irrigation purposes and for domestic use. Work upon this well had been commenced the previous year, as briefly alluded to in our last report, and had been pushed until a depth of about 50 feet had been reached, when operations were suspended without any available supply of water having been reached. Soon after resuming this work in November last, the difficulties encountered were such that the then president of the society, Dr. W. P. Gibbons, in accordance with the views of the board of directors, again suspended the work in order that the superintendent at the station might direct his attention to the care of the orchard.

Dr. Gibbons having handed in his resignation as president of the board of directors, on April 4, 1889, Mr. W. B. Ewer was elected to fill that office.

By a vote of the board of directors, it was decided not to resume work upon the well, but to rely upon winter irrigation and more thorough cultivation for the growth of the orchard. The success which has thus far attended this experiment has been most eminently successful. The dry season has now fairly passed and the orchard never looked better. With more careful attention to winter irrigation during the coming season, it is confidently believed that it can be entirely dispensed with.

During the past season, in addition to our experimental and usual routine work, the society has taken upon itself a portion of the work of the State board of silk culture. That association has for many years been in the annual receipt of an appropriation from the California State legislature, which was expended largely in purchasing and reeling the cocoons which were produced by the people of this State and in giving instruction in filature work.

The last legislature passed the usual appropriation, but for some reason it did not obtain the approval of the governor. Soon after it became time to commence the usual work of hatching and feeding

throughout the State, the State board issued circulars, stating that in consequence of the failure to receive the usual appropriation, the board would be unable to purchase cocoons as they had heretofore done. Upon receipt of these circulars, many who had commenced feeding stopped their work and destroyed their worms.

At this juncture, the Ladies' Silk Society, seeing the disaster which would be inflicted upon the industry if the feeding was stopped altogether, immediately issued other circulars, offering to take up the work of the State board in purchasing cocoons and advising those engaged in the business to continue their work as usual. Those who received the circulars in season did so, but the result has been quite a falling off in the number of cocoons produced the past season. The assurance, however, which has been given that all proper encouragement will hereafter be extended to the industry by our society until such time as the State board may be able to again resume its work will, no doubt, prevent any permanent detriment to the future progress of this interesting and useful industry in California.

This work appeared to the management most imperative, as it was evident to all that if such a step was not promptly taken, most of the work of the promoters of a new industry and most of the expenditure of both State and National Government in that direction in California would have come to naught, and the important and promising interest of sericulture would have been strangled in its infancy in the very locality, of all others, where costly experiments had proven it capable of being most readily carried to the highest point of success.

THE WORK ALREADY DONE IN CALIFORNIA.

True, the silk industry in California is still in its infancy; but enough has been done to show that there are "millions in it," if properly conducted and patiently prosecuted. European silk culturists who have visited our State are unanimous and enthusiastic in pronouncing the conditions of California superior to those of the best silk regions of Europe for prosecuting this industry.

Mistakes were made in the early history of the industry in this State which will not be repeated. But within the past few years much actual progress has been made and enough has been done to prove that, if our present efforts are continued, it will not be long before sericulture will become an established and profitable industry in California.

It requires several years after a mulberry orchard has been planted before the trees attain sufficient growth to produce any considerable number of cocoons. During the last five or six years nearly or quite every agricultural county in the State has planted great numbers of mulberry trees—in some counties aggregating into thousands. During those years experiments, mostly conducted by women and children, by utilizing the few leaves which the young trees have produced, are such as to greatly encourage a more extensive feeding as the trees increase their leafy product. And now, with the further assurance that a ready market for the cocoons will be kept up, these trees will be more fully utilized, and a large increase in cocoons may be expected.

THE SILK CULTURE EXPERIMENTAL STATION.

The Ladies' Silk Culture Society, which makes this report and which is working under the auspices of the General Government, is making steady progress in its experimental work. The station for this work

consists of 15 acres of ground, and is located at Piedmont, just out of the city of Oakland—a locality in every way well fitted for the work. It has already been of much value in advancing silk industry in this State.

The uses of an experimental silk culture station are various and important. Among them may be named cultivating, testing, and determining the best varieties of food trees for the silk-worm and their adaptation to the peculiarities of soil and climate; the breeding of the best varieties of silk-worms, and obtaining the best eggs for distribution; studying the diseases of silk-worms and making known the remedies for the same. All these objects are being carried out as far and as rapidly as our limited means will admit.

In addition to the objects above named a silk culture station should constitute an educational center, where persons desiring information upon any subject relating to silk culture may be able to find it. In its widest aspect, instruction should be given in all the details of hatching and feeding the worms, producing and preserving cocoons and silk-worms' eggs and in reeling the cocoons. To accomplish the latter purpose a filature would be required. Heretofore all filature work in California has been done by the State board.

In order to reach complete success in silk culture all the provisions named should be carried out at the experimental station. Stations of this kind have long been established in all the large silk-producing localities of Europe at government expense, and the fact is there universally acknowledged, that without such aid the silk industries of those localities could not be kept up.

The station at Piedmont is somewhat limited in extent, but much can and is being done on that area. Hitherto our trees have not been sufficiently matured to enable us to carry on the work of feeding to the extent and in the manner to accomplish the best results. But the orchard has now reached a degree of maturity which will enable us to attain better results in the future. The experiments of the present year, however, have been quite successful and complete, as will be fully shown by the annexed reports of the secretary and the chairman of the experimental committee. The exhaustive and scientific report of Professor Rivers testifies to the diligence, skill, and patience with which he has done his important work.

WILL SILK INDUSTRY PAY IN CALIFORNIA?

As a commercial or agricultural industry on a large scale, conducted by companies or capitalists, we answer "no."

As a home, family, or a cottage industry, we most emphatically answer "yes."

Neither this society nor intelligent advocates of silk industry anywhere in this country have ever claimed that it would pay when conducted on a large scale, as is pursued in raising cotton or wheat.

Filatures may thus be carried on by capitalists; but the raw material—the cocoons—should be produced as a family or a cottage industry. That is the way it is done in Europe. The business of producing cocoons should be introduced into families as an auxiliary to their slender incomes, whether on the farm or in towns and villages. It requires only a very small amount of means, just a little piece of cheap land planted with mulberry trees. After a little instruction it can be managed by any person of ordinary intelligence. Small boys and girls are quite competent to attend to the entire work of producing cocoons, as has been fully proven in numerous instances in this State.

It is well known that the business conducted in this manner in France and Italy is a paying industry. Experiments have shown that we can produce better silk in California than can be produced in Europe, on account of the superiority of our climate and the higher mental condition of our people. Moreover the ingenuity and inventive spirit of our working people is always improving on the worn-out and crude methods of the Asiatics, or even those of Europe. Our workmen and workwomen are always quicker and more skillful than the same class of people in Europe. We find this especially true through every class and character of mechanical and all other producers. These manifold advantages, taken in consideration with the far cheaper lands and lower taxes in this country, will more than counterbalance the cheaper labor of Europe. Especially is this the case when we propose to employ only the labor of children and women in families who have no other employment on their hands at the time.

In pursuing this industry we do not propose that a day's labor shall be taken from the farm or vineyard. All the work of producing cocoons may be done, especially in this State, at a time when the farmer and his boys have nothing else to do, and when the household labor is at its lightest.

Stock companies organized for silk culture and managed by agents, clerks, overseers, and large forces of hired men or boys have almost or quite always failed in Europe, as well as in this country. Neither this society nor the consistent advocates of silk culture anywhere throughout the United States have ever

HELD OUT FALSE HOPES

as to great profits and immense fortunes being realized from the industry. Those in this State and elsewhere who have opposed the encouragement of silk culture by State or national governments have done so without due knowledge or consideration of the methods proposed by such promoters of the industry as have looked carefully into the subject, and acted upon mature reflection and careful consideration. It is confidently believed that whoever will read this report thoroughly and carefully consider all the conditions, advantages, and consequences involved must come to a firm conviction of the fact that silk culture can be made to pay in this State and in many other portions of the country as well.

THE MORAL AND HUMANITARIAN ASPECT OF THE INDUSTRY.

We have thus far confined our observations to the pecuniary phases of the industry under discussion. Let us now pass in brief review its moral and humanitarian aspect, which is believed by many to be of the highest importance to the welfare of any community in which the industry may be practically established.

Silk culture is essentially an educational industry and the one best calculated to help on the great humanitarian work of bettering the condition of poor and needy families and providing easy and profitable work for the women and the younger members of such families. It is essentially woman's work. It is elevating in its tendency. In all European and Asiatic countries where it has been introduced it is studiously made elevating and respectable, as well as profitable. In France it is made a part of the education of every young lady, whether in the common school, the academy, or the convent. It is countenanced and made

popular in many countries by the exceptional and warm interest taken in it by well-to-do ladies who move in the highest and most refined society, not excepting even royalty itself.

The object of all this is largely humanitarian. "There are so few industries in which women, children, and infirm persons can profitably engage," says a writer, "that this enterprise would seem to be a godsend to them." There is no hard work about it. Every man who owns a little patch of ground can plant a few mulberry trees upon it. They will arrive at a reasonable state of maturity in four or five years with very little care or cost. That done, let the industry be handed over to the women and children of the household. Three or four persons who may have nothing else to do can then take up the work, and in four or five weeks earn what will contribute materially to the prosperity and happiness of the family and home. If poor, it will well pay the husband and father to help his wife and children to earn a few dollars in this way; if not in need of such earnings, such an example of thrift and industry will tell upon his less fortunate neighbors and largely add to his own and the happiness and prosperity of the neighborhood.

Let such a course as this become general, and bye and bye an industry will be built up in the State and nation which will rank among the leading industries of the country and add thousands and millions annually to the aggregate of wealth. Silk culture in Europe and Asia has long been one of the chief sources of income of those countries, and there is no reason why our own country should not share in such a benefit.

We owe something to our children, and the generations which are to succeed them. There are thousands on all sides who are crying out "give us work." Shall we heed the cry? The opportunity is presented to provide an industry which, if properly established and distributed, will prove of incalculable benefit to our country. Shall we let it pass unheeded? There is a strong tendency to indolence in our State. It is an alarming fact that too many of our young people of both sexes are growing up in idleness. This condition is already beginning to bear fruit of a most noxious kind, and it is only by prompt and great exertion that we can check it. This state of things appeals most earnestly to Christian charity and effort. Idleness is the root of all evil. Give our young people something to do and they will certainly make better women and men than if allowed to grow up in idleness. There is room for thousands of families to engage in silk industry.

Three or four thousand persons in the country spending four or five weeks in the year raising cocoons will give permanent employment, all the year around, to as many persons in the city who may engage in reeling, spinning, and otherwise preparing the raw silk for domestic use.

Did the reader ever think what a vast amount of good such employment would do in this city of San Francisco? The following paragraph appeared several years ago in a city paper. The picture, if drawn today, would be a much darker one. We quote as follows: "Our hoodlum feminine element, which appeals to and should shock the most callous observer to the effect that if Christian charity of churches could be brought to know the dark side of our social panorama, many a dollar that now goes elsewhere would be devoted to the reclamation of American evils that are sinking into the blackest perdition under the very shadow of our steeples," and much more of the same kind. The picture is a truthful one.

Now the training of girls for technical industry, the introduction of

our boys and girls into new avenues of profitable work, would change the character of the picture and give us, instead, additional thousands of happy homes and useful men and women.

Where is there an industry better calculated to afford just the employment needed to bring about such a result than that of producing silk? But it must not be forgotten that it will be the small producer who will make California a silk-producing State. Silk will never be produced in this country until the farmers' families take hold of the business in earnest, and that without any thought of making fortunes out of it. Let them be satisfied with such small sums as from ten or twenty dollars to a hundred or more, according to the number engaged, all earned in the short time of thirty-five or forty days when the labor on the farm and in the household is at its lowest ebb. That the production of cocoons will pay when conducted in this, the only manner of production urged by this association, is a question beyond dispute. The individual efforts may be small in results, but the aggregate will be immense, and may easily be run up into the millions in value. When we have provided the cocoons, capital will come in to purchase them and convert them into articles of value and usefulness, for which there is always a market. The improved and delicate machinery now being used for reeling and spinning will give our skilled labor an immense advantage over the cheap unskilled labor of Europe and Asia, where many generations must pass away before such machinery can be utilized. This and other advantages already noticed will more than wipe out the disadvantage of cheap labor.

The culture of silk is one of the more advanced industries—one that requires skill and intelligence from the time the eggs are hatched until the goods are placed upon the market for consumption. It is just the industry to be taken up by the country in which the average of education among the masses is ahead of that in any other land. The mulberry may be made more profitable than the vine, much more than the wheat field or even the average gold mine. The mulberry tree has been most aptly likened to a gold mine above ground, but with the difference in favor of the tree—that the returns will be far more sure and more continuous.

Let us interest our boys and girls to some extent in the work at once. Then thousands who might otherwise go to ruin will bless the work of our hands. Let it be done at once, even if it is done solely for the benefit of our country and humanity. Let us be vigilant and allow no opportunity to escape that may lead us on to victory.

This work, thanks to a benevolent few and to our National and State Governments, has been well commenced—the people are becoming more and more interested in it, and are being more thoroughly educated up to the importance of the work, both in its humanitarian and in its economical character. We have thus far devoted but a very little of either time or money to the work. When we look abroad and observe the many years and the large amounts of money that it has cost such countries as Italy and France to introduce the industry among their people, we may well take heart and regard the progress that we have made as more than satisfactory.

W. B. FWER, *President of Board of Directors.*
Mrs. L. E. PRATT, *Secretary.*

SECRETARY'S REPORT.

To the President and Members of the Ladies' Silk Culture Society of California:

In looking backward four years to the date of the incorporation of this society, it is with pleasure we record the steady growth and progress in the industry we are banded together to promote. Stated monthly meetings have been held since its organization, also many special meetings, and although the labors are yet few, and the harvest not yet abundant, the utility and success of the enterprise is no longer doubtful, but an accepted fact. The slow and tedious process of completing a typical mulberry orchard for experimental work, the basis of the entire plan of work outlined at the beginning, will in the near future be a reality.

This accomplished, rapid strides will be made in completing the entire plan, at which time we confidently expect sericulture will compete for honors with other agricultural pursuits of the State. Early in the season, as is more fully set forth in the report of the President of the Board, the necessity arose for a home market for cocoons, and this society at once concluded to do the work of purchasing cocoons, hitherto done by the State board. At a meeting of the board of directors, held May 2, sufficient funds were appropriated from the Government allowance to carry on the work. Acting as corresponding as well as recording secretary, my labors were greatly increased, but I have gained a better knowledge of the quantity and quality of cocoons produced. In the production of cocoons nearly every portion of the State has been represented with sufficient good results to prove the adaptability of soil and climate to the perfection of this industry.

On the whole the quality is not up to the standard, and better results must be obtained. during the year I have distributed 150 circulars and books of instruction, and replied to 360 letters of inquiry, often exchanging two or three letters with the same parties as difficulties arose, and still their work was neither satisfactory to themselves or to us. I would therefore recommend a liberal distribution of printed circulars, giving full instructions, early in the season, and I would favor paying good prices where there is evidence of careful, earnest effort, and soon the standard of excellence will be attained. In the absence of a filature, correspondence was opened for marketing the cocoons, with the result of a decision favoring Washington. The cocoon committee and various other committees are in the midst of their labors, therefore unable to report fully at the present time. Full reports will be made to the society at the annual meeting in January, as provided by the constitution. I have an abiding faith in the ultimate success of our work, and, in closing, would again solicit the liberality of the Government to a degree that will enable us to continue in this important work toward perfecting the industry already established, and so well adapted to women and children who are clamoring for independence, and not charity.

Respectfully submitted.

Mrs. L. E. Pratt,
Ladies' Silk Culture Society.

REPORT OF EXPERIMENTAL COMMITTEE.

To the Ladies' Silk Culture Society of California:

The silk experiment for 1889 was began at the Piedmont Station on April 17th, the operator being Mr. L. E. Benton, a student at the University of California, the whole being superintended by myself as chairman of the committee of silk culture, and directed by said committee, the members of which being Mrs. Hittell, Mrs. Williams, Mrs. Pratt, Professor Hilgard and the President of the society, Mr. Ewer.

The experiment was made with the seed of the most select variety of the silk-worms, viz, the *Friularni*, it being the whitest in color and the largest cocoon producer. The experiment, however, of this year can not be considered as perfect as the capabilities of the variety and which was promised by the conditions of the earlier transformations of the various broods. If the Piedmont Station could have supplied sufficient foliage of improved varieties of mulberry-trees, such as *Morus alba*, or *M. rosea*, or *M. nagasaki*, the society might have rejoiced in an entirely satisfactory experiment; but the supply becoming short when it should have been increased, this, together with having to return to *Morus multicaulis* after having fed upon *M. alba*, is one of the causes for the lightness in weight of many of the cocoons. The society owes to Mrs. Williams its best thanks for aiding the experiment by sending almost a daily supply of leaves, though the irregular delivery of them by the express company deteriorated their quality.

The budding and grafting of the old stocks with improved sorts of mulberries would make the station at Piedmont a more suitable place to carry on silk culture. The stove, too, is not at all suitable for heating purposes and for regulating temperature for the cultivation of the silk-worm.

The worms began spinning on May the 20th, being 32 days in going through their changes, a period that was slightly prolonged by irregularity in the food supply. The weight of the cocoons I do not know, but they are at the Piedmont Station awaiting the order of the society as to their disposal. The cocoons that can be reeled are contained in twelve pasteboard boxes covered with green paper and marked "Piedmont Station, Silk Experiment, 1889." The size of each box is the same, 14 by 12 inches. The pierced cocoons occupy a white pasteboard box measuring 24 by 12 inches, and the flossings are to be found in a brown pasteboard box of the measure of 20 by 9 inches. The above mentioned are all at Piedmont. I now place in charge of the secretary of this society a selected assortment of two hundred cocoons agreeable to the order of the committee on silk culture, for the purpose of being forwarded to Washington for inspection. Of course these two hundred represent a higher grade than the general bulk, but though they are selected they are not necessarily better than many of those forming the general stock, for these were not culled from all the others, but simply represent the first two hundred good ones that came to hand, and there remains in all probability a thousand others that are equally good in quality.

Besides the above I retain for the museum of the university a small exhibit of about fifty examples, and I bring with me to-day the few cocoons that formed the experiment of killing by anhydrous hydrocyanic acid.

EGGS.

The stock of eggs for the society's use or order was made in accordance with the instructions of the committee, and a little beyond. The committee came to the conclusion that an ounce of eggs would be sufficient for the next year's experiment. These are contained in 200 bags, a selected pair of moths in each bag, being the producers of about 500 eggs. Besides the above-mentioned eggs I set apart for experiment, a number of double cocoons, and finding that double cocoons yielded very healthy looking moths, I paired a number of these moths and caused them to deposit their eggs upon large surfaces of fine muslin. From the fine condition of these insects I believe them to be in every way good for breeding purposes for the production of silk, the moth being perfect in form, without the deformity of crippled wings, and appeared to be in general good health. The amount of eggs thus obtained may be three ounces and from examination under the microscope I find these eggs from double cocoons to be free from disease.

FEEDING SILK-WORMS.

The silk-worm having been under domestication for centuries and frequently reared under unnatural conditions, it is not surprising that diseases are freely induced among them. The worms in nature have a completely free system of sewerage, feeding as they do upon twigs, and, elevated from the ground and in contact with no accumulated refuse, they must have immunity from many of the forms of disease that are generated in them while under domestic treatment.

Herding a large number of worms upon a horizontal plane is entirely opposed to the methods adopted by nature, for she supplies the worms with varying resting-places at all possible angles, where excrement of every kind fall freely to the ground without any contamination to neighboring worms.

I think that trial should be made of feeding upon twigs after the first moult, and when twigs are unobtainable and leaves alone available that netting on frames should always be substituted, that the excrement should be free to fall to the ground.

METHODS OF DESTROYING THE LIFE OF THE CHRYSALIS.

Several methods of killing the chrysalids were tried for experimental purposes. It was found that five minutes was sufficient to kill in dry steam when the layer of cocoons was only two deep, but ten or fifteen minutes was found necessary according to the depth of layer of cocoons and also the amount of saturation.

Carbon bisulphide proved a very effective method, using an empty coal-oil can, which nearly fill with cocoons, and place on the top of these a cup with a piece of sponge in it, upon which pour an ounce of the bisulphide, and close the can by means of paste and paper and let remain for twelve hours.

Anhydrous prussic acid (hydrocyanic) proved most powerful, and consequently quick in operation; but it being dangerous to the user and causing decomposition to vegetable stains, that occur more or less upon cocoons, and changing these stains into a permanent black dye, the use of this acid is not to be recommended, though it might be advantageous to do so when the silk is to be dyed black.

SPECULATIONS UPON A NEW VARIETY.

During the selection of the moths that were to produce eggs for future experiments there were large numbers of examples that possessed only rudimentary wings. These examples were rejected and thrown out as being unworthy of reproducing their species. After I had destroyed them I thought my action in the matter was a mistake, and that had I thought of it in time and have selected a number and made a distinct experiment results might have proved an advance in silk culture. These forms of both sexes were in the enjoyment of good health, and differed from the others only in having very short tippet-like wings, that could not aid in navigating the air, and which condition was brought about, no doubt, by continued domestication inducing a terrestrial habit. The loss of the powers of flight may be exchanged in the increase of silk, and as there is no waste of force in either seeking mates or food, both being supplied under domestication, an entirely apterous (wingless) variety of silk-worm might be the outcome of judicious selection.

Among the group of insects that silk-worms are classified with are two or three genera of species that possess these tippet-like wings, but the wingless condition occurs only in the female; the male flies freely about, while the female remains always at home.

The loss of a power through the nonuse of that power is not a new theory, but the condition, as I mentioned before, already exists in some near allies of this silk-producing race of moths.

The examination of the parent moth and eggs belonging to this experiment not having been completed has been made the subject of a supplementary report.

Very truly,

J. J. RIVERS,
Chairman Experimental Committee.

SEPTEMBER 7, 1889

SUPPLEMENTARY REPORT.

To the Ladies' Silk Culture Society of California:

I beg to report the result of the miscroscopical examination of the 200 pairs of parent moths selected from those belonging to the silk experiment carried on at the station at Piedmont during this present season of 1889.

The object of the society was to make a good and careful experiment not only in the production of good cocoons but also to acclimatize certain varieties of the silk-producing moth *Bombyx Mori*, so that the society could distribute healthy and robust eggs to those cultivating the silk industry in California.

The experiment in this respect has proved satisfactory. Of a total of 200 pairs (200 males and 200 females), 180 pairs were found to be perfectly free from disease. The remaining 20 pairs exhibited some bacterian bodies that resembled the disease explained by Pasteur as chain-ferment and which he considers the cause of flaccidity and which is supposed to be engendered by the use of fermented leaves, there was no appearance of pebrine or any other disease appertaining to sericulture but the one mentioned above.

During the experiment Mr. Benton discovered some unhealthy worms which he considered flaccidity and which made its appearance soon after feeding the worms with transported leaves. Of course those diseased worms were destroyed as soon as found, but others unperceived, because only slightly affected, passed into the moth state to be discovered only under the microscope. Though the parent moths of these 20 pairs exhibit the disease called flaccidity, yet an examination of their eggs does not disclose any appearance that would even suggest disease, but on the contrary were healthy looking in every particular; but as the parent moths show disease their eggs must be rejected.

I beg to report the above for the consideration of the Ladies' Silk Culture Society of California.

Respectfully, yours,

J. J. RIVERS,
Chairman Experimental Committee.

Ladies' Silk Culture Society of California, in account with Department of Agriculture—credit by bills paid.

[Statement of expenditures during Dr. Gibbons's term of office.]

Voucher number.	Date.	To whom paid.	Items.	Amount.
	1888.			
	Aug. 2	Otto Hagland	Labor at station	$35.00
	Aug. 2	Daniel Reardon	do	23.00
	Aug. 2	Mrs. L. E. Pratt	Salary as secretary, July	25.00
90	Aug. 2	W. G. W. Harford	Salary and board of laborers	105.41
91	Dec 6	do	do	91.83
92	Dec. 10	Otto Hagland	Labor at station	51.84
93	Dec. 10	Puget Sound Lumber Co	Lumber	29.52
94	Dec. 10	Frank Halley	Shoeing horses	2.25
95	Aug. 2	William P. Gibbons	Balance on sundries	1.25
95*a*	Dec. 6	Mrs. L. Pratt	Salary as secretary, August	25.00
95*b*	Dec. 6	do	Salary as secretary, September	25.00
95*c*	Dec. 6	do	Salary as secretary, October	25.00
95*d*	Dec. 6	do	Salary as secretary, November	25.00
95*e*	Dec. 6	William P. Gibbons	Balance on account rendered	15.30
95*fg*	Aug. 2	J. B. Vasburg	Sundries noted in voucher	5.00
95*h*	July 5	V. S. Northey	Ironing well-bucket	3.50
	1889.			
96	Feb. 7	W. G. W. Harford	Salary, etc., noted in voucher	57.40
97	Feb. 7	Blaire	Sharpening picks, etc	2.25
98	Feb. 7	Pierce & Co	Giant cartridges and caps	10.50
99	Feb. 7	J. D. Southwell	Examining well	1.00
100	Feb. 7	Charles J. Welch	Feed	6.95
101	Feb. 7	Baker & Hamilton	Pole, pick, and handles	2.25
102	Feb. 7	Mrs. L. E. Pratt	Postals and postage	.75
103	Feb. 7	do	Salary as secretary, December	25.00
103*a*	Feb. 7	do	Salary as secretary, January	25.00
104	Feb. 7	William P. Gibbons	Board of horses and telegrams	33.25
105	Feb. 7	Alameda Bank	Discount on note	6.10
106	Feb. 7	W. G. W. Harford	Salary at station	70.00
		Total		729.35

[Statement of expenditures during Mr. Ewer's incumbency, ending June 30, 1889.]

	1889.	William P. Gibbons	Statement brought over	$729.35
107	Apr. 4	do	Board of horse	9.00
108	Apr. 4	Mrs. L. E. Pratt	Salary as secretary, February	25.00
109	Apr. 4	W. G. W. Harford	Salary at station	48.93
110	Apr. 4	Mrs. L. E. Pratt	Salary as secretary, March	25.00
111	Apr. 4	Samuel A. Luce	Salary at station	65.00
112	Apr. 4	M. L. Gray	Plowing, hire, and feed of teams	53.75
113	May 2	Mrs. L. E. Pratt	Postal-cards and postage	2.50
114	May 2	do	Salary as secretary, April	25.00
115	May 2	Samuel A. Luce	Salary at station	65.00
116	May 2	L. E. Benton	Tending worms	50.00
117	May 2	Mrs. L. E. Pratt	Stationery, stamps, and cards	10.00
118	May 2	M. L. Gray	Harrowing and cultivating	6.00
119	May 2	W. B. Ewer	Supplies at station, noted in voucher	13.60
120	May 2	do	Cocoons and expressage	11.35
121	June 6	Samuel A. Luce	Salary at station, May	65.00
122	June 6	L. E. Benton	Tending worms	12.80
123	June 6	Mrs. L. E. Pratt	Salary at secretary, May	25.00
124	June 6	W. B. Ewer	Supplies noted in voucher	26.15
125	June 6	N. S. Thompson	Drug poison	4.20
126	June 6	Pierce & Co	Hardware	3.00
127	June 6	J. Fisher	Barley	5.00
128	June 6	M. Wright	Drayage to station	4.50
129	June 6	Otto H. Putzker	Labor at station	17.00
130	June 6	F. A. Leach	Cocoons	18.00
131	June 6	C. W. Howard	Drayage of cocoons at station	5.00
132	June 6	Mrs. S. Spratt	Cocoons	55.25
133	June 6	Mrs. J. B. Babcock	do	50.60
134	June 6	Mrs. L. Nilson	do	36.60
135	June 6	Miss Hattie Robinson	do	23.10
136	June 6	Mamie E. York	do	20.80
137	June 6	Mrs. B. F. Ohriger	do	16.25
138	June 6	Mrs. Mary F. Walker	do	8.60
139	June 6	Miss Davenhill	do	3.90
140	June 6	Miss Evelyn Craig	do	2.50
141	June 6	Mrs. C. Ross	do	2.50
142	June 6	Miss Lizzie Rollins	do	1.25
143	June 6	B. C. Pressley	do	18.75
144	June 6	Mrs. G. W. Fuller	do	1.00

Ladies' Silk Culture Society of California, in account with Department of Agriculture—credit by bills paid—Continued.

Voucher number.	Date.	To whom paid.	Items.	Amount.
	1889.			
145	June 29	Mrs. J. Lucas	Instruction book	$1.10
146	June 29	Prof. J. J. Rivers	Experimental work	50.00
147	June 29	Samuel A. Luce	Salary at station, June	65.00
148	June 29	Mrs. S. A. Sellers	Cocoons	40.00
149	June 29	Alameda County	Taxes	44.50
150	June 29	Mrs. L. E. Pratt	Salary as secretary, June	50.00
151	June 29	Columbus Buggy Co	Buggy and harness	110.00
152	June 29	C. Chamberlain	Flossing cocoons and board of laborers	18.00
153	June 29	Miss O. Abrams	Cocoons	63.70
154	June 29	Miss E. H. Bigelow	do	8.40
155	June 29	Henry Hasard	do	4.30
156	June 29	Miss Lizzie Cakebread	do	5.50
157	June 29	Mrs. M. J. Wells	do	5.00
158	June 29	H. B. Williams	do	5.00
159	June 29	Francis M. Bastian	do	9.00
160	June 29	Mrs. S. E. Hathaway	do	26.00
161	June 29	A. Agnew	do	4.50
162	June 29	Mrs. C. B. White	do	5.75
163	June 29	J. Fisher	Contract for feed	50.00
164	June 29	Mrs. D. Fike	Cocoons	13.00
165	June 29	Miss Nellie Turner	do	50.50
166	June 29	Puget Sound Lumber Co	Contract for lumber	103.07
167	June 29	Prof. J. J. Rivers	Microscopical work	75.00
168	June 29	Mrs. L. E. Pratt	Supplies for Ex. noted in voucher	5.00
169	June 29	M. Barr	Horseshoeing	2.00
170	June 29	Samuel A. Luce	Freighting cocoons to station	2.90
171	June 29	Felix Gillet	Mulberry buds	6.00
172	June 29	Mrs. H. B. Churchman	Cocoons	.70
173	June 29	Charles Blair	Labor contract	54.60
174	June 29	Bosqui Engraving Co	Printing contract	50.00
175	June 29	John Irving	Cocoons	.50
176	June 29	Katie J. Collier	do	1.50
177	June 29	Prof. J. J. Rivers	Boxes for cocoons	1.25
178	June 29	H. H. Everett	Cocoons	1.00
179	June 29	Miss Jane Dodd	do	1.00
		Total		2,500.00

RECAPITULATION.

Paid by Dr. Gibbons	$729.35
Paid since, as per voucher	1,770.65
Total	2,500.00
Received from Government	2,500.00

Examined and found to be correct.
San Francisco, October 15, 1889.

R. J. TRUMBULL,
EDWARD BOSQUI,
Auditing Committee.

REPORT OF JOSEPH NEUMANN.

WASHINGTON, D. C., *December* 31, 1889.

SIR: I have the honor to present herewith my report upon the subject of the native wild silk-worm, as required of me by public act No. 116 of the laws enacted in the second session of the Fiftieth Congress, which reads as follows:

AN ACT making an appropriation for the Department of Agriculture for the fiscal year ending June 30, 1890, and for other purposes.

* * * * * * *

For the continuation of the study and experiments by Joseph Neumann of the wild native silk-worm of California, two thousand five hundred dollars, to be paid directly to said Joseph Neumann; and the said Joseph Neumann shall report the results of such work to the Secretary of Agriculture on or before the first day of January, eighteen hundred and ninety.

I also submit with this report a number of cocoons, being samples of a quantity obtained by me, the result of experiments made during the past year. These cocoons are in themselves convincing proof that the wild silk-worm discovered by me in California in 1884 is really valuable and its cultivation promises beneficent results.

In continuing my study and researches I visited Santa Clara County, Cal., in the early part of the year, and also Mount Hamilton and the surroundings of the Lick Observatory. Unfortunately the season was late, the weather cold and generally unfavorable and the worm could not be found there. I then visited other sections of the State, especially Sonoma County, where I had found the wild silk-worm in former years, but also with poor results, for I discovered but a few of them. The reason for their scarcity in this neighborhood was discovered in the fact that curiosity-seekers wanted specimens of the worm, and a large number of people, especially boys, had been hunting and doing a thriving business in them. The same condition applied to San Francisco, where the worm used to be found in large numbers.

Fortunately I had quite a number of live cocoons of the wild silk-worm in my possession, which passed through the process of breeding. I was thus enabled to put large numbers of young worms on bushes of the wild holly, both in the open air and in inclosed rooms. Those in the rooms I fed on branches of said plant, the stems of which I kept in water, and in that condition they remained good food for four or five days. While the worm would be better preserved in a room than in the open air, it has been demonstrated that it is hardier and thrives much better in the open air.

This wild silk-worm is the only one, so far found, whose culture in the open air is successful. It feeds upon a species of "Cascara Sagrada," or wild holly, that grows in great abundance throughout the more temperate regions of California, indigenously, and can be produced

successfully from the line of Jackson County, Oregon, to New Orleans, where the altitude does not render its growth impracticable. The same climate and conditions requisite to its growth can be found in many portions of Arizona and New Mexico. The limited time that I have had for making experiments has rendered it impossible for me to determine what the best and surest plan will be to propagate this plant upon which the wild silk-worm feeds—whether by transplanting the scions in an orchard or grove, or from the seed. This important fact must be determined by experiments made in the proper way when sufficient time is allowed for the proper tests. But as the "wild holly" grows abundantly and indigenously all through the region of country adapted climatically to the production of silk, I do not hesitate to say that the plants can be easily and successfully produced by either method.

The season through which the wild silk-worm can be successfully worked is from two and a half to three months. Later in the year, the latter part of September, I exhibited the food plant, live worms, and cocoons raised during the past season at the fair in Sacramento, Cal., held by the state board of agriculture; and I may add that the exhibition attracted general attention of a very favorable character.

The cocoons produced by the wild silk-worm, as demonstrated by the samples submitted herewith, are in reality silk, and they are precisely of the same kind as that which originally came from the East Indies and which in its manufactured state is known under the name of "pongee" silk, and has grown to be a very large factor in commerce. Thousands of bales are annually exported from the East Indies. In former years it was not much used, the French alone utilizing it for "chop," which means a short-fiber spun silk. They became more valuable in this country when the Messrs. Cheney Brothers, of Connecticut, and the Messrs. Riley, of Paterson, N. J., began to use the short fiber for spun silk. They are still more valuable now, as a machine has been invented in France for reeling the cocoons into long fiber, the same as the mulberry species. A skein of the long fiber is submitted herewith for proof.

If the fiber of the native wild silk-worm cocoon were good only for spun silk, or if it were even only fit for the manufacture of fine paper, the discovery would still have to be classed as a valuable one, but as reeled it is nearly as valuable as mulberry silk. I have never claimed and do not now claim that the texture of the fiber of the native worm is equal to that of the mulberry species; but it certainly equals the silk of the East Indies, and its production can not fail to be of immense benefit to this country. The culture of the mulberry species on the American continent, which was first attempted about two hundred and thirty years ago, has so far comparatively few results to show because of the great opposition and competition of foreign producers; but the culture of the native worm promises rich rewards in the immediate future if properly cared for by the Government.

For further information as to my work in developing the wild silk-worm of California I refer you to the photographic view taken of the worms fed by me last season and to the live cocoons, as well as the cocoons of the previous year's production, together with the observations of the press of California, whom I invited to witness my operations; all of which will be found in the office of the Assistant Secretary of Agriculture.

I most respectfully recommend the establishment of two experimental stations in the State of California; one of them should be located on the Government military reservation known as the Presidio, in the city

of San Francisco. It was in the vicinity of this reservation that the wild silk-worm was first discovered in the year 1884. The reason why I advocate the establishment of a station here is that there are still a great many plants in the immediate vicinity upon which the worm feeds; but they are being uprooted by the owners of these lands, who are preparing the latter for sale as building lots. It would not be very expensive to transplant them to the Presidio for preservation and thus provide food for the worms.

A second station should be established in the interior of the State, where the season is earlier and where no fogs interfere with the culture of the worms or with the experiments.

In my opinion the cocoons produced in the interior of the State are somewhat heavier than those produced in the city. The season is so much earlier in the interior that the work there could be completed before the hatching season begins at San Francisco, where the climate is much colder, so that the same laborers could perform much of the work at both stations. By the results of the experiments on these two stations would be demonstrated the financial value of the culture of the native wild silk-worm.

I most respectfully call your attention to the bills on the subject for the development of silk culture of the mulberry species, introduced by Hon. J. M. Mitchell, of Oregon, in the Senate and by the Hon. W. W. Morrow, of California, in the House of Representatives. They are in accordance with my views and ideas for the promotion of silk culture.

Your most obedient servant,

JOSEPH NEUMANN.

Hon. J. M. RUSK,
Secretary of Agriculture.

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